

CLAIMS

What is claimed is:

1. An electronic device fabricated in a device stack such that magnetic fields are generated at a boundary of the device stack, comprising:
 - 5 at least one layer within the device stack that is magnetic and produces a magnetic field at a boundary during operation; and
 - 10 a sink layer, fabricated as a second layer within the stack, to modify the magnetic fields at the boundary during operation.
 2. The invention according to claim 1 wherein the electronic device comprises a magnetic random access memory cell as formed within the device stack.
 - 15 3. The invention according to claim 1 wherein the electronic device comprises a semiconductor diode as formed within the device stack.
 4. The invention according to claim 1 wherein the electronic device comprises a transistor device as formed within the device stack.
 5. The invention according to claim 1 wherein the sink layer extends beyond the border of the device stack.
 6. The invention according to claim 1 wherein the sink layer is at least twice the area of the device stack.
 - 20 7. The invention according to claim 1 further comprising a second electronic device stack fabricated adjacent the sink layer wherein the sink layer attenuates magnetic fields generated at an edge boundary of the second device.
 8. A memory device comprising:
 - 25 a sense layer;
 - a pinned layer;
 - a barrier layer placed between the sense and pinned layers;
 - a pinning layer placed adjacent to the pinned layer; and
 - a magnetic sink layer, placed within the memory device, to attenuate magnetic field effects at the boundaries of the sense, pinned and pinning layers.
 9. The magnetic memory device according to claim 8 whercin the magnetic sink layer comprises a seed layer having a first portion in adjacent alignment with the pinning layer, the first portion functioning as a pinned layer, and a second portion, not adjacent to the pinning layer, and extending beyond the alignment of the other layers and the first portion.

10. The magnetic memory device according to claim 8 wherein the magnetic sink layer is comprised of a soft ferromagnetic material.

11. The magnetic memory device according to claim 9 wherein the sense layer and the pinned layer are comprised of a soft ferromagnetic material.

5 12. The magnetic memory device according to claim 8 further comprising a conductive non-magnetic layer adjacent to the magnetic sink layer.

13. The magnetic memory device according to claim 8 wherein the sense layer is a top layer.

10 14. The magnetic memory device according to claim 12 wherein the conductive non-magnetic layer is a top layer.

15. An array of magnetic memory devices comprising:
a plurality of sense lines;
a plurality of pinned layers, one for each of the magnetic memory devices within the array;

15 a plurality of barrier layers, one placed between a sense layer and each pinned layer;

a plurality of pinning layers running generally perpendicular to the plurality of sense lines and at least partially aligned with a portion of the pinned layers; and

20 at least one magnetic sink, placed in electro-magnetic communication with at least one of the magnetic memory devices within the array, to modify magnetic field effects at the boundaries of a word line, a pinned layer, and a pinning line associated with the at least one magnetic memory device.

25 16. The magnetic memory array according to claim 15 wherein the magnetic sink comprises at least one seed layer having a first portion adjacent which an associated pinning line is formed, the first portion functioning as a pinned layer, and a second portion extending beyond the other layers and the first portion.

17. The magnetic memory array according to claim 15 wherein the magnetic sink comprises a soft magnetic material.

30 18. The magnetic memory array according to claim 15 wherein the magnetic sink extends along one of the lines formed within the array.

19. The magnetic memory array according to claim 15 further comprising a conductive non-magnetic layer adjacent to the magnetic sink.

20. A method of fabricating an electronic device on a semiconductor substrate in a stack arrangement, comprising:

5 forming at least one layer within the stack that is electro-magnetically conductive and that produces a magnetic field at an edge boundary during operation; and

forming a sink layer adjacent the stack to modify the magnetic field during 10 operation.

21. The method according to claim 20 wherein the forming at least one layer step further comprises fabricating a magnetic random access memory cell within the 15 stack.

22. The method according to claim 20 wherein the forming at least one layer step further comprises fabricating a semiconductor diode within the stack.

23. The method according to claim 20 wherein the forming at least one layer step further comprises forming a transistor device within the stack.

24. The method according to claim 20 wherein the sink layer is formed to extend beyond the border of the stack.

25. The method according to claim 20 wherein the sink layer is formed to be at least twice the area of the stack arrangement.

26. The method according to claim 20 further comprising fabricating a second electronic device adjacent the sink layer wherein the sink layer modifies any magnetic 20 fields generated at an edge boundary of the second device.

27. A method of fabricating a bottom structure magnetic memory device comprising:

25 forming a magnetic sink layer upon a substrate;

forming a pinning layer adjacent to the magnetic sink;

forming a pinned layer adjacent to the pinning layer;

forming a barrier layer adjacent to the pinned layer;

30 forming a sense layer adjacent to the barrier layer, wherein the magnetic sink layer is utilized to modify magnetic field effects at the boundaries of the sense, pinned and pinning layers.

28. The method of fabricating a magnetic memory device according to claim 27 wherein the forming of the magnetic sink layer comprises:

forming a seed layer;

removing part of the seed layer resulting in a first portion in substantial adjacent alignment with the pinning layer, the first portion functioning as a pinned layer, and a second portion, not adjacent to the seed layer, and extending beyond the alignment of the other layers and the first portion.

5 29. The method of fabricating a magnetic memory device according to claim 27 further comprising selecting NiFe as the magnetic sink layer.

30. The method of fabricating a magnetic memory device according to claim 27 further comprising selecting a ferromagnetic material as the sense layer and the pinned layer.

10 31. The method of fabricating a magnetic memory device according to claim 27 further comprising, prior to forming the magnetic sink layer, forming a conductive non-magnetic layer wherein the magnetic sink layer is formed adjacent to the conductive non-magnetic layer.

32. A method of fabricating a top structure magnetic memory device comprising:

15 forming a sense layer upon a substrate adjacent to the pinning layer;
forming a barrier layer adjacent to the sense layer;
forming a pinned layer adjacent to the pinned layer;
forming a pinning layer adjacent to the pinned layer;
20 forming a magnetic sink layer upon the pinning layer, wherein the magnetic sink layer is utilized to modify magnetic field effects at the boundaries of the sense, pinned and pinning layers.

33. The method of fabricating a magnetic memory device according to claim 32 wherein the forming of the magnetic sink layer comprises:

25 forming a seed layer;
removing part of the seed layer resulting in a first portion in adjacent alignment with the pinning layer, the first portion functioning as a pinned layer, and a second portion, not adjacent to the seed layer, and extending beyond the alignment of the other layers and the first portion.

30 34. The method of fabricating a magnetic memory device according to claim 32 further comprising selecting a soft ferromagnetic material.

35. The method of fabricating a magnetic memory device according to claim 32 further comprising selecting a ferromagnetic material as the sense layer and the pinned layer.

36. The method of fabricating a magnetic memory device according to claim 32 further comprising, prior to forming the magnetic sink layer, forming a conductive non-magnetic layer wherein the magnetic sink layer is formed adjacent to the conductive non-magnetic layer.